IS 7945 (1976): Trichlorfon, Technical [FAD 1: Pesticides and Pesticides Residue Analysis]

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Indian Standard

SPECIFICATION FOR TRICHLORFON, TECHNICAL

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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
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SPECIFICATION FOR TRICHLORFON, TECHNICAL

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Indian Standard

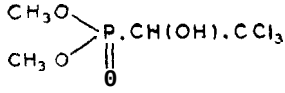
SPECIFICATION FOR TRTCHLORFON, TECHNICAL

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 28 January 1976, after the draft finalized by the Pest Control Sectional Committee had been approved by the Agricultural and Food Products Division Council and the Chemical Division Council.

0.2 Trichlorfon is a contact and stomach insecticide and is used largely for controlling agricultural pests, household pests, and for the control of ectroparasites of domestic animals.

0.2.1 Trichlorfon is the common name accepted by the International Organization for Standardization (IS0) for the pesticidal chemical dimethyl (2, 2, 2-trichloro-1-hydroxyethyl) phosphonate. The empirical and structural formulae and the molecular weight of the compound are as indicated below:

Empirical Formula	*Structural Formula*	*Molecular Weight*
$C_4H_8Cl_3O_4P$		257·5

0.3 **In** the preparation of this standard, due consideration has been given to the provisions of the Insecticides Act, 1968 and Rules, framed thereunder. However, this standard is subject to the restrictions imposed under these, wherever, applicable.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS :2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for trichlorfon, technical.

2. REQUIREMENTS

2.1 Description — The material shall essentially comprise dimethyl (2, 2, 2-trichloro-1-hydroxyethyl) phosphonate and shall be in the form of white crystalline powder, free from any foreign matter and added modifying agents.

2.2 The material shall also comply with the requirements given in Table 1.

TABLE 1 REQUIREMENTS FOR TRICHLORFON, TECHNICAL

SL No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST, REF TO	
			Appendix	Cl No. of IS : 6940-1973*
(1)	(2)	(3)	(4)	(5)
i)	Trichlorfon content, percent, by mass, *Min*	95	A	—
ii)	Material insoluble in acetone, percent by mass, *Max*	0·5	—	9
iii)	Melting point	77°-84°C	—	6
iv)	Moisture, percent by mass, *Max*	0·7	—	4.1
v)	Acidity (as H_2SO_4), percent by mass, *Max*	0·7	—	11.32
vi)	Alkalinity (as NaOH), percent by mass, *Max*	0.05	—	11.3.3

*Methods of tests for pesticides and their formulations.

3. PACKING AND MARKING

3.1 Packing — The material shall be packed in clean and dry mild steel containers.

3.2 **Marking** — The containers shall be securely closed and shall bear legibly and indeliblv the following information in addition to the information as is necessary under the Insecticides Act and Rules:

a) Name of the material,
b) Name of the manufacturer,
c) Date of manufacture,
d) Batch number,

e) Trichlorfon content,

f) Net mass of contents, and

g) The minimum cautionary notice worded as under:

'HANDLE WITH CARE. KEEP OUT OF REACH OF CHILDREN AND WELL AWAY FROM FOODSTUFFS, ANIMAL FEEDS, AND THEIR CONTAINERS. AVOID SKIN CONTACT. WHILE HANDLING WEAR PROTECTIVE GLOVES AND CLEAN PROTECTIVE CLOTHING. IN CASE OF POISONING CALL PHYSICIAN. SPECIFIC ANTIDOTES — ATROPINE AND PRALIDOXIME. '

3.2.1 The containers may also be marked with the IS1 Certification Mark.

NOTE — **The use of the ISI Certification Mark** is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The **ISI** mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by IS1 and operated by the producer. IS1 marked products are also continuously checked by IS1 for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the **ISI** Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

4. SAMPLING

4.1 Representative samples of the material shall be drawn according to the method prescribed in 'Indian Standard Methods for sampling of pesticides and their formulations (*under preparation*)'.

NOTE **-Till such time this standard is published, the sampling shall be** done as agreed to between the parties concerned.

5. TESTS

5.1 Tests shall be carried out by the methods referred to in col 4 and 5 of Table 1.

5.2 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (see IS :1070-1960*) shall be employed in tests.

NOTE — ' Pure chemicals ' shall mean chemicals that do not contain impurities which affect the results of analysis.

*Specification for water, distilled quality (revised).

APPENDIX A

[*Table* 1, *Item* (i)]

DETERMINATION OF TRICHLORFON CONTENT

A-O. GENERAL

A-O.1 For the determination of the trichlorfon content, two methods have been prescribed. Either of these methods may be used, but the method employed should be stated while expressing the result of the test.

A-l. METHOD I

A-1.0 Principle — The sample is hydrolysed quantitatively in a mixture of methanol and 2-aminoethanol to form chlorine ions. Trichlorfon content is then measured by the difference between the total chlorine thus produced and the amount of inorganic (ionic) chlorine present in the sample before hydrolysis.

A-l.1 Reagents

A-1.1.1 *Methanol* -- anhydrous.

A-1.1.2 *2-Aminoethanol* — *99* percent pure. Purify by distilling. Collect the fraction which boils at 171- 173°C and store in tightly stoppered bottle.

A-1.1.3 *Nitric Acid* — *20* percent (*v*/*v*), chlorine-free.

A-1.1.4 *Standard Silver Nitrate Solution* — 0·1 N.

A-l.2 Procedure

A-1.2.1 *Determination of Hydrolysable Plus Inorganic Chlorine* — Weigh accurately about 1 g of the sample into a 250-ml Erlenmeyer flask and dissolve in 90 ml of anhydrous methanol. Add 10 ml of 2-aminoethanol and keep for exactly one hour at 20 ±0·5°C. Cool in ice water and add 50 ml of dilute nitric acid. Keep at 20°C and titrate electrometrically with standard silver nitrate solution.

A-1.2.2 *Determination of Inorganic Chlorine* — Weigh accurately about 1 g of the sample into a 250-ml Erlenmeyer flask and dissolve in 100 ml of distilled water. Keep for 5 minutes at room temperature, acidify with 5 ml of dilute nitric acid and titrate electrometrically with standard silver nitrate solution.

A-1.3 Calculations

A-1.3.1 Trichlorfon content, percent by mass $= \left[\frac{v_1}{m_1} - \frac{v_2}{m_2} \right] \times 2'575 \times f$

where

v_1 = volume in ml of standard silver nitrate solution used in determining hydrolysable plus inorganic chlorine,

v_2 = volume in ml of standard silver nitrate solution used in determining inorganic chlorine,

m_1 = mass in g of sample used for the hydrolysable plus inorganic chlorine determination,

m_2 = mass in g of sample used for the inorganic chlorine determination, and

f = correction factor (see A-1.3.1.1).

A-1.3.1.1 *Correction factor* — Determine the value of the correction factor (f) from the formula:

$$f = \frac{13{\cdot}77}{A}$$

where

A = actual value, percent by mass for hydrolysable chlorine in recrystallized dimethyl (2, 2, 2-trichloro-1-hydroxyethyl) phosphonate determined by the procedure described above and using the same reagents.

NOTE — The correction factor f is intended to allow for errors due to impurities in the reagents, as well as those inherent in the method itself or in its application by a given laboratory. Its value shall lie within the range 0·98-1·02.

A-2. METHOD II

A-2.0 Principle — The total chlorine content is determined by refluxing the material with aqueous sodium hydroxide, which is followed by titration of the liberated chloride with standard silver nitrate solution.

A-2.1 Reagents

A-2.1.1 *Sodium Hydroxide Pellets*

A-2.1.2 *Nitric Acid Solution — 6 N.*

A-2.1.3 *Standard Silver Nitrate Solution* — 0·1 N.

A-2.1.4 Standard Ammonium Thiocyanate Solution — 0·1 N.

A-2.1.5 Ferric Ammonium Sulphate Solution — prepared by dissolving 40 g of ferric ammonium sulphate in 100 ml distilled water.

A-2.1.6 *Phenolphthalein Indicator Solution* — one percent (*m/v*), in rectified spirit (see IS : 323-1959*).

A-2.2 **Procedure** — Weigh accurately sufficient quantity of the sample, to contain 0·3 g of trichlorfon in a 250-ml Erlenmeyer flask. Add 40 ml distilled water and stir to dissolve the sample. After adding 10 g of sodium hydroxide pellets, reflux for one hour. Without removing the condenser, allow the flask to cool for 5 minutes. Rinse the inside of the condenser with a small quantity of distilled water. Cool to room temperature, add a drop of phenolphthalein indicator solution and add nitric acid solution till the colour of the indicator disappears. Further add 10 ml nitric acid solution and 50 ml standard silver nitrate solution. Digest the precipitate on a hot water-bath for 90 minutes, cool to room temperature and titrate with standard ammonium thiocyanate solution using ferric ammonium sulphate solution as an indicator.

A-2.2.1 Carry out blank titration of 50 ml standard silver nitrate solution with standard ammonium thiocyanate solution using ferric ammonium sulphate solution as an indicator.

A-2.3 Calculations

A-2.3.1 Trichlorfon content, percent by mass $= \dfrac{(V_1 - V_2) \times N \times 8{\cdot}587}{M}$

where

V_1 = volume in ml of standard ammonium thiosulphate solution required for the blank determination (A-2.2.1),

V_2 = volume in ml of standard ammonium thiosulphate solution required for the test with the material (A-2.2),

N = normality of the standard ammonium thiosulphate solution, and

M = mass in g of the material taken for the test.

*Specification for rectified spirit (*revised).*

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IS:

560-1969 BHC, technical and refined (*second revision*)
563-1973 DDT, technical (*second revision*)
882-1956 *gamma*-BHC (lindane)
1251-1973 Zinc phosphide, technical (*first revision*)
1306-1974 Aldrin, technical (*first revision*)
1309-1974 Endrin, technical (*first revision*)
1486-1969 Copper oxychloride, technical (*first revision*)
1488-1969 2, 4-D sodium, technical (*first revision*)
1682-1973 Cuprous oxide, technical (fungicidal grade) (*first revision*)
1832-1961 Malathion, technical (*first revision*)
1833-1961 Diazinon, technical
2128-1973 Parathion ethyl, technical (*first revision*)
2570-1963 Methyl parathion, technical
2863-1964 Chlordane, technical
3898-1966 Zineb, technical
3900-1975 Ziram, technical (*first revision*)
3902-1975 Dimethoate, technical (*first revision*)
3904-1966 Thiometon concentrates
4320-1967 Thiram, technical
4321-1967 2, 4-D technical
4344-1967 Endosulfan, technical
4451-1967 Toxaphene, technical
4929-1968 Dichlorvos, technical
4958-1968 Phosphamidon, technical
5278-1969 Dicofol, technical
5280-1969 Fenitrothion, technical
5526-1969 Coumafuryl, technical
5551-1970 Warfarin, sodium, technical
5552-1970 Warfarin, technical
6432-1972 Heptachlor, technical
7158-1978 Isobornyl Thiocyano acetate (thanite), technical
7529-1975 Carbaryl, technical

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